

SUPPLEMENTAL AMENDMENT OF CLAIMS 26 and 27:

In supplement to the previously submitted amendment filed on 07 February 2007, claims 26 and 27 are amended as follows:

1.-19. (Previously Cancelled)

20. (Cancelled) A steerable diagnostic catheter comprising:

an elongated, tubular central member having a distal end and a proximal end, said central member having a deformable end portion proximate said distal end;

a catheter body having a proximal portion and a distal portion enveloping said central member, said distal portion including a probe assembly formed by

a plurality of deformable lengths of multi-lumened tubing forming splines disposed in parallel and surrounding relationship to the deformable end portion of said central member, each said length of multi-lumened tubing having a first end affixed to the distal end of said central member by an end cap, and a second end affixed to the distal end of said proximal portion of said catheter body, and

a plurality of electrodes distributed along the length of each spline, said electrodes being formed by circumscribing metal rings;

a handle affixed to the proximal end of said catheter body, and including a steering actuator and a slider means for enabling relative axial movement between said proximal portion and said central member;

a plurality of signal wires extending through said handle, said proximal portion and the lumens of said splines, a distal end portion of each said signal wire being deformed and extending through an opening in the outer wall of its corresponding tubing, said deformed portion being ohmically connected to one of said rings by mechanical engagement thereto;

at least one steering wire having a first end affixed to said steering actuator and extending therefrom through said central member, a second end of said at least one steering wire being affixed to the distal end of said central member;

whereby movement of said slider means in a first direction causes contraction of said distal portion of said catheter body resulting in deployment of said lengths of multi-lumened tubing away from central member, and

whereby manipulation of said steering actuator causes retraction or extension of said at least one steering wire resulting in deformation of said deformable end portion and said probe assembly thereby enabling said catheter to be steered.

21. (Previously Amended) A steerable diagnostic catheter as recited in claim 27 wherein said each of the spline forming tubes includes a central lumen having a length of spring wire disposed therein to provide conformal forces causing the splines to conform to the surfaces being inspected.

22. (Previously Amended) A steerable diagnostic catheter as recited in claim 27 wherein said steering actuator is pivotably mounted to said handle.

23. (Previously Amended) A steerable diagnostic catheter as recited in claim 27 wherein said steering actuator is pivotably mounted to said slider means.

24. (Previously Amended) A steerable diagnostic catheter as recited in claim 27 wherein said steering actuator is pivotably mounted to rotate about a pivot pin disposed within said handle and extends through a slot formed therein.

25. (Previously Amended) A steerable diagnostic catheter as recited in claim 24 wherein said first end of said steering wire is connected to said steering actuator on one side of said pivot pin, extends through said central member to the distal end thereof where it engages said central member, and then back through said central member to said handle where a second end thereof is connected to said steering actuator on an opposite side of said pivot pin, whereby movement of said steering actuator in one direction causes deflection of said probe assembly in one direction and movement of said steering actuator in an opposite direction causes deflection of said probe assembly in another direction.

26. (Currently Amended) A steerable diagnostic catheter [as recited in claim 20 wherein] comprising:

an elongated, tubular central member having a distal end and a proximal end, said central member having a deformable end portion proximate said distal end;

a catheter body having a proximal portion and a distal portion enveloping said central member, said distal portion including a probe assembly formed by

a plurality of deformable lengths of multi-lumened tubing forming splines disposed in parallel and surrounding relationship to the deformable end portion of said central member, each said length of multi-lumened tubing having a first end affixed to the distal end of said central member by an end cap, and a second end affixed to the distal end of said proximal portion of said catheter body, and

a plurality of electrodes distributed along the length of each spline, said electrodes being formed by circumscribing metal rings;

a handle affixed to the proximal end of said catheter body, and including a steering actuator and a slider means for enabling relative axial movement between said proximal portion and said central member;

a plurality of signal wires extending through said handle, said proximal portion and the lumens of said splines, a distal end portion of each said signal wire being deformed and extending through an opening in the outer wall of its corresponding tubing, said deformed portion being ohmically connected to one of said rings by mechanical engagement thereto, wherein said mechanical engagement of [said] each said ring to a corresponding signal wire is facilitated by a short length of wire partially wrapped about the corresponding tubing, passing beneath said deformed portion and lying between the ring and the tubing;

at least one steering wire having a first end affixed to said steering actuator and extending therefrom through said central member, a second end of said at least one steering wire being affixed to the distal end of said central member;

whereby movement of said slider means in a first direction causes contraction of said distal portion of said catheter body resulting in deployment of said lengths of multi-lumened tubing away from central member, and

whereby manipulation of said steering actuator causes retraction or extension of said at least one steering wire resulting in deformation of said deformable end portion and said probe assembly thereby enabling said catheter to be steered.

27. (Currently Amended) A steerable diagnostic catheter [as recited in claim 20 wherein] comprising:

an elongated, tubular central member having a distal end and a proximal end, said central member having a deformable end portion proximate said distal end;

a catheter body having a proximal portion and a distal portion enveloping said central member, said distal portion including a probe assembly formed by

a plurality of deformable lengths of multi-lumened tubing forming splines disposed in parallel and surrounding relationship to the deformable end portion of said central member, each said length of multi-lumened tubing having a first end affixed to the distal end of said central member by an end cap, and a second end affixed to the distal end of said proximal portion of said catheter body, and

a plurality of electrodes distributed along the length of each spline, said electrodes being formed by circumscribing metal rings;

a handle affixed to the proximal end of said catheter body, and including a steering actuator and a slider means for enabling relative axial movement between said proximal portion and said central member;

a plurality of signal wires extending through said handle, said proximal portion and the lumens of said splines, a distal end portion of each said signal wire being deformed and extending through an opening in the outer wall of its corresponding tubing, said deformed portion being ohmically connected to one of said rings by mechanical engagement thereto, wherein said mechanical engagement of each said ring to a corresponding signal wire is achieved by folding said deformed portion back upon itself such that interference of the folded portion with the deformed portion maintains mechanical engagement of the folded portion to the ring;

at least one steering wire having a first end affixed to said steering actuator and extending therefrom through said central member, a second end of said at least one steering wire being affixed to the distal end of said central member;

whereby movement of said slider means in a first direction causes contraction of said distal portion of said catheter body resulting in deployment of said lengths of multi-lumened tubing away from central member, and
whereby manipulation of said steering actuator causes retraction or extension of said at least one steering wire resulting in deformation of said deformable end portion and said probe assembly thereby enabling said catheter to be steered.

28. (Previously Amended) A steerable diagnostic catheter comprising:
an elongated, tubular central member having a distal end and a proximal end, said central member having a deformable end portion proximate said distal end;
a catheter body having a proximal portion and a distal portion enveloping said central member, said distal portion including a probe assembly formed by
a plurality of deformable lengths of multi-lumened tubing forming splines disposed in parallel and surrounding relationship to the deformable end portion of said central member, each said length of multi-lumened tubing having a first end affixed to the distal end of said central member by an end cap, and a second end affixed to the distal end of said proximal portion of said catheter body, and
a plurality of electrodes distributed along the length of each spline, said electrodes being formed by circumscribing metal rings;
a handle affixed to the proximal end of said catheter body, and including a steering actuator and a slider means for enabling relative axial movement between said proximal portion and said central member;
a plurality of signal wires extending through said handle, said proximal portion and the lumens of said splines, a distal end portion of each said signal wire being deformed and extending through an opening in the outer wall of its corresponding tubing, said deformed portion being ohmically connected to one of said rings by mechanical engagement thereto;
at least one steering wire having a first end affixed to said steering actuator and extending therefrom through said central member, a second end of said at least one steering wire being affixed to the distal end of said central member;

said central member further including a first tube having its proximal end affixed to said handle, a coil spring having a proximal end attached to the distal end of said central member, and second and third tubes having their proximal ends affixed to the distal end of said coil spring, wherein said steering wire extends through said first, second and third tubes;

whereby movement of said slider means in a first direction causes contraction of said distal portion of said catheter body resulting in deployment of said lengths of multi-lumened tubing away from central member, and

whereby manipulation of said steering actuator causes retraction or extension of said at least one steering wire resulting in deformation of said deformable end portion and said probe assembly thereby enabling said catheter to be steered.

29. (Previously Amended) A steerable diagnostic catheter as recited in claim 28 wherein said deformable end portion of said central member is formed by a tube including first and second lumens extending along the length thereof and having first and second coil springs disposed therein, the proximal ends of said first and second coil springs respectively engaging the distal ends of said first and second tubes, said steering wire passing therethrough, said first and second coil springs aiding in compression control of said probe assembly.

30. (Original) A steerable diagnostic catheter as recited in claim 29 wherein said probe assembly further includes a C-shaped tube having one end engaging the distal end of said first coil spring and the other end engaging the distal end of said second coil spring, said steering wire passing through said C-shaped tube.

31. (Previously Amended) A steerable diagnostic catheter as recited in claim 29 wherein said deformable end portion of said central member has a coaxially disposed lumen of generally rectangular transverse cross section extending along its length, said transverse cross section having a first dimension substantially longer than its orthogonal dimension, said first and second lumens being disposed on opposite sides of said coaxially disposed lumen and lying in a plane orthogonal to

said first dimension, said coaxially disposed lumen tending to aid in the uniplanar deflection of said probe assembly.

32. (Previously Amended) A steerable diagnostic catheter comprising:

- an elongated, tubular central member having a distal end and a proximal end, said central member having a deformable end portion proximate said distal end;
- a catheter body having a proximal portion and a distal portion enveloping said central member, said distal portion including a probe assembly formed by
 - a plurality of deformable lengths of multi-lumened tubing forming splines disposed in parallel and surrounding relationship to the deformable end portion of said central member, each said length of multi-lumened tubing having a first end affixed to the distal end of said central member by an end cap, and a second end affixed to the distal end of said proximal portion of said catheter body, and
 - a plurality of electrodes distributed along the length of each spline, said electrodes being formed by circumscribing metal rings;
 - a handle affixed to the proximal end of said catheter body, and including a steering actuator and a slider means for enabling relative axial movement between said proximal portion and said central member;
 - a plurality of signal wires extending through said handle, said proximal portion and the lumens of said splines, a distal end portion of each said signal wire being deformed and extending through an opening in the outer wall of its corresponding tubing, said deformed portion being ohmically connected to one of said rings by mechanical engagement thereto;
 - at least one steering wire having a first end affixed to said steering actuator and extending therefrom through said central member, a second end of said at least one steering wire being affixed to the distal end of said central member, and
 - wherein said deformable end portion of said central member is formed by a tube including first and second lumens extending along the length thereof and wherein said steering wire has a generally D-shaped transverse cross section and extends through said central member with the flat face of the portion thereof

extending through said first lumen facing the flat face of the portion thereof extending through said second lumen;

whereby movement of said slider means in a first direction causes contraction of said distal portion of said catheter body resulting in deployment of said lengths of multi-lumened tubing away from central member, and

whereby manipulation of said steering actuator causes retraction or extension of said at least one steering wire resulting in deformation of said deformable end portion and said probe assembly thereby enabling said catheter to be steered;

33. (Original) A steerable diagnostic catheter as recited in claim 32 wherein said deformable end portion of said central member has a coaxially disposed lumen of oval transverse cross section and wherein said probe assembly further includes a coil spring disposed within said coaxially disposed lumen.